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AUTHOR Cornbleth, Catherine
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ABSTRACT

Using a case study approach, this paper examines how science and social studies curriculum materials are used in the elementary classroom. The major questions of interest to the study are: What differences in curriculum materials use and classroom activity patterns are evident when old programs are replaced with new ones? To what extent do purportedly innovative, multimedia science and social studies curricula differ from their conventional textbook-oriented counterparts as both are actually used by pupils? Pupil activity and use of materials were observed in fourth and fifth grade classes. The cognitive, psychosocial, and perceptual motor dimensions of the materials were described utilizing the Annehurst Curriculum Classification System. Results indicated that the new science programs are more interactive and perhaps more challenging than the old program but still afford relatively little opportunity for physically and intellectually active pupil participation. With the new social studies materials, students used a greater variety of media and most often chose materials that provide an established interpretation of events. Overall, the findings of the study were not of the magnitude or in the direction intended by developers and advocates of the new curricula. In this instance, the introduction of new science and social studies programs appeared to have been more of a technical innovation than a substantive reform. (Author/RM)

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A Case Study of "Old" Versus "New" Curriculum Materials Use in Elementary Science and Social Studies

Catherine Cornbleth

University of Pittsburgh

Paper presented at the annual meeting of the American Educational Research Association, Boston, April 1980.

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Abstract

This paper explores the nature and role of curriculum materials in classroom instruction. The following questions were of particular interest: What differences in curriculum materials use and classroom activity patterns are evident when old programs are replaced with new ones? To what extent do purportedly innovative, multimedia science and social studies curricula differ from their conventional textbook oriented counterparts -- as both are actually used by pupils? Pupil activity and materials use were observed in fourth and fifth grade science and social studies classes; curriculum materials were described using the Annehurst Curriculum Classification System. Results are discussed in terms of the likely socialization effects of curriculum materials use and the potential of curriculum materials for fostering desired learning outcomes.

A Case Study of "Old" Versus "New" Curriculum Materials Use in Elementary Science and Social Studies

In this paper, the nature and role of curriculum materials in classroom instruction are examined, drawing on a case study of pupils' materials use in elementary science and social studies.

Curriculum materials are teaching-learning tools. They are tangible things used by teachers and pupils during classroom instruction that are intended to help pupils acquire or develop certain knowledge, beliefs, and behavior. Not only does a considerable portion of instructional time involve materials use (Cornbleth, 1979; EPIE, 1977), but curriculum materials, particularly textbooks, appear to play a major role in science and social studies instruction (e.g., Stake & Easley, 1978).

Typically, curriculum materials have been examined for their inclusion, omission, or treatment of specified phenomena (e.g., ethnic groups, conflict), with an emphasis on the content covered or the opportunity provided to learn criterion material (e.g., Rosenshine, 1976; Walker & Schaffarzick, 1974). In addition to consideration of curriculum materials in terms of the information they contain and presumably convey to pupils, it is likely that other features of curriculum materials affect pupil learning. For example, to the extent that materials are attractive and stimulating, they are likely to increase pupil motivation and involvement in learning activities. Additionally, differences among curriculum materials likely interact with individual differences among pupils, differentially affecting pupil learning (e.g., Berliner & Rosenshine, 1977; Frymier, 1977). Poorly motivated pupils, for example, might be expected to benefit more from materials that are attractive and

stimulating than from those that are less appealing while this might not be the case for pupils who already are well motivated.

The role of curriculum materials in classroom instruction, however, cannot be adequately examined and interpreted in isolation from the context of use. The meaning and impact of curriculum materials depends on how they are used by teachers and pupils in classroom situations (see Apple & King, 1977; Keddie, 1971; Walker, 1971). A curriculum material or combination of materials can be used in more than one way, and materials frequently are used in ways other than those intended by their developers (see Morrissett, Stevens, & Woodley, 1969 and Sarason, 1971 for accounts of intended versus actual use).

Of particular importance for understanding the role of curriculum materials are the classroom activities associated with materials use. Relevant dimensions on which these activities might vary include: (a) the activity format of materials use (from individual to whole class, from private to public); (b) the extent of overt pupil involvement (from listening to a tape or reading a book to completing a worksheet or manipulating an object); and (c) the nature of the tasks in which pupils are engaged while using curriculum materials (from data intake and reproduction to more complex forms of information processing and idea generation). A social studies textbook, for example, might be used by an individual pupil working alone or by a group of pupils working with the teacher, for silent reading or for reference in a recitation, as a source of information to complete a worksheet consisting of information recall questions or as one of several information sources to be compared and evaluated.

In the presentation of the case study and the discussion that follow, selected aspects of the nature and context of use of curriculum materials are

described and implications for pupil learning are explored. The major questions of interest are: What differences in curriculum materials use and classroom activity patterns are evident when old programs are replaced with new ones? To what extent do purportedly innovative, multimedia science and social studies curricula differ from their conventional textbook oriented counterparts -- as both are actually used by pupils? Given curriculum materials with certain characteristics, what is their potential for fostering desired outcomes?

In relation to these questions, the following data were obtained: (a) the proportion of instructional time that curriculum materials, types of media, and materials with different characteristics were used by pupils; and (b) the types of classroom activities associated with the use of particular kinds of curriculum materials.

The Case Study

One of the school districts with which university faculty were working in 1978 and 1979 decided to implement new elementary science and social studies programs during the 1978-79 school year. This decision afforded an opportunity to observe and compare curriculum materials use in the old and new programs.

The old programs in both subject areas consisted of narrative textbooks and workbooks or worksheets. Teachers were provided minimal direction and thus were relatively free to conduct science and social studies as they preferred. The new programs were multimedia kits with detailed teacher guides for implementation. Generally, the new science and social studies programs provided for hands-on, inquiry oriented experiences designed to promote concept learning, critical thinking skills, open-mindedness, understanding of other cultures, independent learning, creativity, and cooperative interpersonal relations.

Pupil use of science and social studies curriculum materials was observed in two elementary schools in an integrated, urban working class community. Pupils in four, fourth grade classes were observed during the textbook based instruction. In the next school year, pupils in five, fifth grade classes were observed during instruction with the multimedia programs. Most of the fifth graders had been part of the previous year's fourth grade sample.

Four pupils were observed during each classroom observation. Twenty to thirty minute observation periods in each subject area (neither science nor social studies instruction typically lasted more than a half hour) were distributed across the days of the week and the classrooms in the two schools. There was a total of 130 pupil observations, 32 during the old programs (14 science and 18 social studies) and 98 during the new programs (42 science and 56 social studies).

Individual pupil activity was coded on a minute-by-minute basis during each observation period, according to activity format (individual, small group, large group), type of academic or nonacademic activity, and curriculum materials use. Management (e.g., disciplinary), transitional (e.g., putting away supplies), and other (e.g., walking around) activities were coded as nonacademic. More than twenty different academic activities and activity combinations (e.g., viewing a diagram on the chalkboard during a recitation) were distinguished and then grouped into 10 categories. Interobserver agreement was 97 percent for activity format, 91 percent for activity type, and 89 percent for materials use.

The 10 academic activity categories and the activities in each category are:

Reading (reading-silent, reading-oral, reading-silent + listening)

Writing (writing-copying, writing-worksheet, reading-silent + writing-worksheet, viewing + writing-worksheet)

Creating (writing-divergent, viewing + writing-divergent, reading-silent + writing-divergent)

Listening and/or Viewing (listening, viewing, listening + viewing)

Recitation (recitation-listening, recitation-speaking, recitation-listening + viewing, speaking)

Discussion (discussion-listening, discussion-speaking)

Projects or Games (game, project, listening + project, roleplaying, art)

Quizzes

Conferences with the Teacher

Other (checking work, work-related conversation with another pupil, other)

The following activity scores were obtained for each pupil observation: involved time, the proportion of observed time that the pupil was engaged in academic activity; three format time scores, the proportion of observed time that the pupil spent in each academic activity format; ten academic activity time scores, the proportion of observed time that the pupil spent in each academic activity category; three nonacademic activity time scores, the proportion of observed time that the pupil spent in each nonacademic activity category; and materials use time, the proportion of observed time that the pupil used curriculum materials in conjunction with an academic activity.

The Annehurst Curriculum Classification System (ACCS: Frymier, 1977) was employed to analyze the nature of the curriculum materials used by pupils (see Davis, Frymier, & Clinefelter, 1977). ACCS provides for the description of curriculum materials on cognitive, psychosocial, and perceptual-motor

dimensions. With ACCS, materials are categorized according to media type and described as high or low on each of 10 dimensions according to specified descriptors. The 10 curriculum dimensions are experience (experiential background needed by pupils), intelligence (intellectual sophistication called for), motivation (interest arousing qualities), emotion-personality (individual, human characteristics depicted or encouraged), creativity (open-endedness), social (interpersonal orientation), and involvement of verbal expression, auditory perception, visual perception, or motor coordination.

At the conclusion of each of the two observation phases of the study, the curriculum materials used by pupils were collected and analyzed. Inter-coder agreement for the ACCS classification of materials was 85 percent.

From the ACCS analysis, two types of curriculum materials use scores were obtained for each pupil observation: media use, the proportion of observed time that the pupil used each type of media; and high materials use, the proportion of observed time that the pupil used curriculum materials rated high on each ACCS dimension.

Curriculum materials use. Comparison of the proportion of observed time that pupils used curriculum materials in conjunction with academic activities during the old (P1) and new (P2) programs revealed that materials were used less frequently during P1 than P2 in both subject areas. However, the difference in materials use time between P1 and P2 was significant for science ($F(1,54) = 7.35$, $p < .009$), but not for social studies. In science, pupils used curriculum materials an average of 62.26 percent of the time in P1 and 42.70 percent of the time in P2. In social studies, the mean materials use time was 59.62 percent in P1 and 48.04 percent in P2.

The mean proportion of time that pupils used various types of media in science and social studies during P1 and P2 is presented in Table 1. Table 2 presents the means for use of curriculum materials high on the ACCS dimensions.

Insert Tables 1 and 2 about here

In science, pupils most often used textbooks and workbooks. A greater variety of media was used by pupils in social studies, including maps, globes, and audiotapes as well as textbooks and worksheets. Films, transparencies, and resource persons were not used in either subject area.

Generally, a relatively small amount of the time that pupils used curriculum materials was spent with materials high on the ACCS dimensions. Pupils used materials high on the motivation and visual perception dimensions more often than materials high on the other ACCS dimensions. No high emotion-personality or auditory perception materials were used in science, and no high verbal expression materials were used in either subject area.

Old versus new curriculum materials use. Pupils' use of various types of media and high ACCS curriculum materials during P1 versus P2 was analyzed separately for science and social studies. For science, multivariate analysis did not yield a significant difference in media use; P1 and P2 did not differ significantly in the types of media used by pupils. For social studies, the difference was significant ($F(9,64 = 4.33, p < .001)$, with pupils using a greater variety of media during P2. Less time was spent with worksheets and textbooks, and more time was spent with audiotapes and graphic materials, including maps, during P2.

For both science and social studies, multivariate analysis showed a significant difference in high ACCS curriculum materials use between P1 and P2 (science, $F\ (10,45) = 49.58$, $p < .001$; social studies, $F\ (10,63) = 17.57$, $p < .001$).

In science, there were significant univariate differences between P1 and P2 in the use of materials high on the intelligence and creativity dimensions. During P1, the science materials that pupils used were fact oriented, requesting or requiring recall of information, whereas during P2 pupils spent time using materials that were concept oriented, requesting or requiring more complex information processing. Although pupils used materials that afford more opportunity for information processing during P2, they did not use materials that encourage creative thought. In contrast, during P1 pupils did use materials that provide opportunities and encouragement for creativity.

In social studies, significant univariate differences between P1 and P2 in the ACCS characteristics of the curriculum materials used by pupils were found for the social dimension and three of the four perceptual-motor dimensions. During P1, pupils more frequently used materials high on visual perception, but did not use materials high on auditory perception. During P2, pupils used materials high on auditory perception, but did not use materials high on motor coordination. Although promoting positive interpersonal and intergroup relations is an explicit goal of the new social studies curricula, pupils spent less time using materials high on the social dimension during P2.

Pupil activities. Mean pupil involved time, format time, academic activity time, and nonacademic time during P1 and P2 are presented in Table 3. In science, pupil involved time was significantly greater in P2 than P1 ($F\ (1,52) = 10.43$, $p < .002$). Although there was less involved time during

P2 than P1 in social studies, the difference was not significant.

Insert Table 3 about here

For both subject areas, multivariate analysis revealed significant differences between P1 and P2 for academic activity format, academic activities, and nonacademic activities. (Academic activity format: science, $F(3,50) = 12.38$, $p < .001$; social studies, $F(3,68) = 4.74$, $p < .005$. Academic activities: science, $F(10,43) = 8.70$, $p < .001$; social studies, $F(10,61) = 6.05$, $p < .001$. Nonacademic activities: science, $F(3,50) = 4.78$, $p < .005$; social studies, $F(3,68) = 7.49$, $p < .001$.)

The significant univariate differences between P1 and P2 in pupil activity include the following. Pupils spent more time in individual format academic activities during P1 in both science and social studies, and more time in large group format academic activities during P2 in science. The differences in academic activity formats in the old and new programs are reflected in the differences in time spent in various academic activities. For both subject areas, time spent in writing (typically, completing individual worksheets) was greater in P1, and listening-viewing (typically involving large group observation of a teacher demonstration or explanation) was greater in P2. Also, during P2 in social studies, pupils spent less time in recitation and discussion and more time with projects and quizzes. With regard to nonacademic activities, during P2 there was more time in transition activity in social studies and less time in management activity in science.

Discussion

A basic assumption underlying this study is that to understand the role of curriculum materials in classroom instruction, it is necessary to examine how materials are used. That is, understanding the role that curriculum materials play requires attention not only to their characteristics but to their context of use. Certainly, isolating the effects of curriculum materials from how they are used in classrooms is difficult at best (e.g., Klein, 1978).

The importance of the context of curriculum materials use -- particularly the extent of materials use and the associated activities -- can be seen in the following example of differences in the presentation of a P2 social studies lesson. The lesson was intended to involve pupils in considering who might have discovered America. The curriculum materials for this task include several sets of cards containing information, drawings, maps, and questions. In Mr. R's classroom, the task was explained to the class, and then pupils worked in small discussion groups scattered around the room, each with its own set of task cards and varying degrees of teacher assistance. Mr. R allowed pupils to continue beyond the time allocated for social studies in order to complete the activity. In Ms. S's classroom, the task was explained to the class, and pupils remained at their desks, arranged in rows. The first pupil in each row was given a set of task cards to look at and then pass back to the other pupils in the row. Meanwhile, Ms. S raised questions similar to those on the task cards, solicited pupil responses, and monitored pupil attention. After approximately a half hour, Ms. S ended the lesson, indicating that it would be completed later in the week.

Of the differences evident in this brief description of the two classes using the same curriculum materials, most important here are the differences in the extent of pupil use of materials and the associated activities. In Mr. R's class, for example, while materials use was less systematic (pupils in each group were to share a set of task cards), there was more opportunity for extended pupil contact with the materials. Also, pupils in Mr. R's class could spread out the task cards and look at them in relation to one another whereas pupils in Ms. S's class could not (and some pupils in the back seats did not see the task cards until the end of the activity). Interaction among pupils was encouraged in Mr. R's class and discouraged in Ms. S's class. Mr. R provided differential assistance to individual pupils while Ms. S attended to the class as a whole. These differences illustrate how the context of curriculum materials use might provide both opportunities and constraints for pupil learning.

Old Versus New Programs

Science. In science, academic activity was more highly materials dependent in the old program. Materials were used 93 percent of the time pupils were involved in academic activity during P1, but only 54 percent of involved time during P2.

The old and new science curricula were similar with respect to the types of media used, despite the potential for diverse media use afforded by the new program. Media use in science consisted exclusively of print materials (books, worksheets) in P1. Although some models and lab materials were used during P2, print materials remained predominant.

The ACCS characteristics of the science curriculum materials that were used did differ by program, however, particularly on the intelligence and creativity dimensions. P2 materials use afforded more opportunity for cognitive skill development and less opportunity for creativity. Generally, the inquiry orientation of P2 materials use appeared to be rather narrowly conceived, providing a version of science that left little room for discovery.

In addition, there were program differences in pupil activity. Pupil involvement in learning activity was greater in P2, and there was less time spent in management. It is not clear, however, whether there were fewer management problems or whether teachers allowed pupils more freedom in P2.

There was some small group activity during P2 (compared to none in P1), but the major differences in academic activity format were less frequent individual and more frequent large group activities during P2. With regard to types of academic activities, there were prominent differences in the frequency of writing and listening-viewing activities. Pupils spent less time completing worksheets and more time listening to teacher presentations and explanations in P2. Also, there was some project activity (usually in a small group format) in P2, but none in P1.

Overall, what emerges from these comparisons of curriculum materials use is a picture of the new science program as more interactive and perhaps more challenging than the old program but still affording relatively little opportunity for physically and intellectually active pupil participation.

Social studies. In social studies, the old and new programs did not differ in terms of materials use or involved time. However, there were program differences in the characteristics of the curriculum materials used and the associated activities.

A greater variety of media was used during P2. Whereas pupils more frequently used books and worksheets in P1, they spent more time using audio-tapes and graphic materials (maps, charts, photos) in P2. These findings appear to be similar to those of Sie, Baker, and Voelkner (1973) who observed the types of media used in traditional compared to locally developed new social studies programs in third, fifth, eighth, and tenth grade classrooms. For their fifth and eighth grade samples, pupils in the traditional classes more frequently used books while pupils in the experimental classes more frequently used charts, maps and audio-visual materials.

In addition to differences between P1 and P2 in the extent to which pupils used curriculum materials that were high on the ACCS perceptual-motor dimensions, there was a difference in use of materials high on the social dimension. Given the stated objectives of the new curricula (and most school social studies programs) regarding development of understanding and empathy for other people and cultures, substantial use of social studies materials high on the social dimension would be expected, particularly in P2. However, pupils used materials high on the social dimension only 12 percent of the time that they were involved in academic activity during P2 compared to 50 percent during P1. Also, no time in P1 and very little time in P2 was spent using materials (a) that are intellectually sophisticated or stimulating (high on the intelligence dimension), (b) that encourage novel or divergent responses (high on the creativity dimension), or (c) that evoke a positive sense of self-esteem and receptivity to change (high on the emotion-personality dimension). Most often, pupils used materials that provide a set interpretation of events.

Pupils spent more time in transitions during P2, which seems to reflect the greater variety of academic activity during the new program. More than half the time that pupils were involved in academic activity during P1

was spent in large group, textbook related recitations interspersed with brief teacher presentations, oral reading from the textbook, and some discussion. Approximately one-third of the pupils' involved time was spent in writing activities, usually completing worksheets or copying information and "terms" from the chalkboard. More varied pupil activities characterized the new program. During P2, listening-viewing was most frequent, usually with the whole class listening to an audio-tape and following the speaker's directions for a writing or project activity. Recitation, although less frequent than in P1, also was prominent. Pupils spent approximately 10 percent of involved time in projects (compared to none in P1) and more time taking quizzes. Compared to P1, discussion and writing activities occurred infrequently.

A general impression was that materials use was more regimented and mechanical in P2. For example, during lessons involving the use of audio-tapes, pupil questions often were discouraged (possibly because they interrupted the planned sequence and the taped speaker), and the emphasis seemed to be on following directions to complete a task more than on acquiring knowledge or skills. Overall, the prominence of highly structured large group activities during P2 suggests that, contrary to the stated intent of the new program, the pupils' social studies experiences were essentially passive, with little opportunity for individual choice or cooperative activity. With a few exceptions, pupils were limited to the roles of recipient of information and respondent to questions posed by the teacher or curriculum materials. Similar descriptions of social studies classroom activity have been noted by Shaver, Davis, and Helburn (1978).

Science and social studies. Overall, there were differences between the old and new programs in the amount of time materials were used, the types of media and the characteristics of the materials used, and the format and type of (academic and nonacademic) activities associated with materials use. However, the findings were not always of the magnitude or in the direction intended by developers and advocates of the new curricula. In this instance, the introduction of new science and social studies programs appears to have been more of a technical innovation than a substantive reform (see House, 1978). It may be that with continued use of the new curriculum materials, teachers will become more familiar and comfortable with them and the context of use will change in ways that are more compatible with the intent of the programs. On the other hand, it is possible that the use of the new curriculum materials will be further adapted to conventional patterns.

Implications for Pupil Learning

Given use of curriculum materials with certain characteristics, what is their potential for fostering desired outcomes? Regarding how knowledge is selected and packaged for use in schools, examination of the ACCS dimensions of the old and new curriculum materials that were used suggests that what was communicated to pupils was that (a) there are certain acceptable ways of thinking and believing, (b) one should defer to experts, and (c) the way things are should be accepted as generally right and good.

For example, no time in science or P1 social studies (and relatively little time in P2 social studies) was spent with materials that could be described as tentative, change oriented, or eliciting pupil decision-making and responsibility (high on the emotion-personality dimension). Instead,

most of the materials pupils used presented information in an unequivocal, impersonal manner, seemingly unrelated to pupils' experiences or interests. Similarly, for most of the time that pupils were engaged in academic activity, the materials used were low on the creativity dimension. For the most part, the activities associated with materials use embodied similar features. There was, for example, no time spent in creating activities in science or P2 social studies. Also, relatively little time overall was spent in small group activities. However, project activity was more frequent in the new programs, particularly in social studies.

As they were used by pupils, under teacher direction, neither the traditional nor the new curriculum materials seems very likely to encourage active pupil inquiry or personal-social development and responsibility. Rather, the curriculum materials appear more apt to foster socialization in terms of pupil compliance with adult expectations for appropriate behavior and pupil acceptance of expert definitions of worthwhile knowledge. Similar conclusions have been reached in classroom studies conducted in an American kindergarten (Apple & King, 1977), an English secondary school (Keddie, 1971), and American elementary and secondary schools (Stake & Easley, 1978).

In sum, understanding the role of curriculum materials in classroom instruction requires examination of the context of use. More than classroom observation of materials use is needed, however, to discern what impact materials use has on pupil learning and how change might be effected. If changes are desired, it becomes necessary to determine why curriculum materials are used in particular ways, including the forces operating to maintain existing practices. These might include extra classroom influences (e. g., school policies, community expectations) as well as teachers' perceptions of pupil ability and their beliefs about the purposes of schooling.

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Table 1

Media Use in the Old and New Science and Social Studies Programs

Media Type	Proportion of Observed Time			
	Science		Social Studies	
	Old n=14	New n=42	Old n=18	New n=56
Films, slides, etc.	0	0	0	0
Records, tapes, etc.	0	0	0	14.96*
Transparencies	0	0	0	0
Workbooks, worksheets	34.07	19.76	12.79	3.98*
Books, magazines, etc.	28.14	18.62	42.67	10.70*
Posters, maps, photos, etc.	0	0	1.28	12.45*
People (other than the teacher)	0	0	0	0
Games, kits, simulations	0	0	0	1.61
Globes, models, artifacts, etc.	0	4.29	2.83	4.36

*Univariate $p < .05$

Table 2

Use of High ACCS Curriculum Materials in the Old and New Science and Social Studies Programs

ACCS Dimension	Proportion of Observed Time			
	Science		Social Studies	
	Old n=14	New n=42	Old n=18	New n=56
Experience	14.76	18.61	15.68	8.33
Intelligence	0	18.61*	0	7.02
Motivation	47.50	36.15	18.33	27.53
Emotion-Personality	0	0	0	2.56
Creativity	28.21	0*	0	1.61
Social	0	1.90	39.99	9.29*
Verbal Expression	0	0	0	0
Auditory Perception	0	0	0	17.08*
Visual Perception	34.05	23.85	58.32	27.56*
Motor Coordination	0	1.90	9.07	0*

*Univariate $p < .05$

Table 3

Pupil Activity with Old and New Science and Social Studies Programs

Activity	Proportion of Observed Time			
	Science		Social Studies	
	Old n=14	New n=42	Old n=18	New n=56
Involved Time	66.55	79.06*	79.75	72.18
Academic Activity Format				
Individual	36.73	14.01*	30.52	14.61*
Small Group	0	6.91	4.63	2.95
Large Group	29.82	58.14*	44.60	54.55
Academic Activities				
Reading	9.93	6.48	5.61	5.05
Writing	21.64	4.26*	17.44	2.11*
Creating	0	0	.22	0
Listening-Viewing	.86	22.91*	6.33	24.30*
Recitation	20.07	32.79	37.72	20.91*
Discussion	10.07	3.93	9.28	2.07*
Projects, Games	0	6.98	0	7.86*
Quiz	1.43	0	.17	7.18*
Conference	1.43	.55	.56	.16
Other	4.29	1.19*	4.28	2.50
Nonacademic Activities				
Management	13.64	4.74*	4.72	4.45
Transition	2.64	5.55	1.89	7.47*
Other	14.21	10.48	11.94	15.88

*Univariate $p < .05$